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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/810,637	03/29/2004	Tadashi Sakai	250203US2TTCRD DIV	9575

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EXAMINER	
COLON, GERMAN	

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/810,637	SAKAI ET AL.	
	Examiner	Art Unit	
	German Colón	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/098,571.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Preliminary Amendment

1. The Pre-Amendment, filed on March 29, 2004, has been entered and acknowledged by the Examiner.

2. Cancellation of claims 1-20 has been entered.

3. Addition of claims 21-34 has been entered.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 21, 22 and 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 6,281,626) in view of Kumar (US 5,861,707).

Regarding claim 21, Nakamura discloses a cold cathode discharge device comprising:

an envelope **23** filled with a discharge gas therein;

a cold cathode **11** comprising a supporting member **12** of conductive material and an electron emitter **13** with an electron-emitting surface to emit electrons supported by the supporting member, the electron emitter being positioned in the envelope (see Fig. 9);

and the discharge gas comprises a rare gas and mercury (see Col. 10, line 49). Nakamura is silent regarding the electron emitter comprising a mixed phase of diamond phase and conductive carbon phase.

However, in the same field of endeavor, Kumar discloses a cold cathode comprising an electron emitter having a mixed phase of diamond phase **14** and conductive carbon phase **42**, the diamond phase comprises granular bodies and the conductive carbon phase being formed between the granular bodies, and teaches said electron emitter to provide a thermally stable emission area, a longer lifetime of the device in operation, and to require only a relatively small voltage for emission to occur (see Col. 3, lines 55-56, 62-63, and Col. 6, line 3). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electron emitter disclosed by Kumar in the cold cathode discharge device of Nakamura, in order to provide a thermally stable emission area, a longer lifetime of the device in operation, and to require only a relatively small voltage for emission to occur.

Regarding claim 22, Nakamura-Kumar discloses the discharge gas comprising xenon (see `626, Col. 19, line 1).

Regarding claim 24, Nakamura-Kumar discloses the conductive carbon phase comprising graphite (see Col. 6, lines 1-4 of `707).

Regarding claim 25, Nakamura-Kumar discloses the electron-emitting surface being rough and the conductive carbon being exposed on the surface (see Figs. 3E and 5E of `707).

Regarding claim 26, Nakamura-Kumar discloses the envelope being an elongated envelope having the supporting member in both end regions thereof (see `626, Fig. 9).

6. Claims 21-23 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (US 6,281,626) in view of Patterson et al. (US 6,441,550).

Referring to claim 21, Nakamura discloses a cold cathode discharge device comprising:

an envelope **23** filled with a discharge gas therein;

a cold cathode **11** comprising a supporting member **12** of conductive material and an electron emitter **13** with an electron-emitting surface to emit electrons supported by the supporting member, the electron emitter being positioned in the envelope (see Fig. 9);

and the discharge gas comprises a rare gas and mercury (see Col. 10, line 49). Nakamura is silent regarding the electron emitter comprising a mixed phase of diamond phase and conductive carbon phase.

However, in the same field of endeavor, Patterson discloses a cold cathode comprising an electron emitter having a mixed phase of diamond phase **201** and conductive carbon phase **203**, the diamond phase comprises granular bodies and the conductive carbon phase being formed between the granular bodies, wherein the conductive carbon extends in the form of a channel, and teaches said electron emitter to provide a device having a longer lifetime and capable of operating at higher current densities and greater stability over longer time periods than emitter materials of the prior art (see Col. 6, lines 14-24). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electron emitter disclosed by Patterson in the cold cathode discharge device of Nakamura, with the purpose of providing a device having a longer lifetime and capable of operating at higher current densities and greater stability over longer time periods than emitter materials of the prior art.

Referring to claim 22, Nakamura-Patterson discloses the discharge gas comprising xenon (see `626, Col. 19, line 1).

Referring to claim 23, Nakamura-Paterson discloses the diamond of the electron emitter including a donor impurity (see Col. 4, lines 27-31 of `550).

Referring to claim 26, Nakamura-Patterson discloses the envelope being an elongated envelope having the supporting member in both end regions thereof (see '626, Fig. 9).

Referring to claim 27, Nakamura-Patterson discloses the conductive carbon phase extending in the form of a channel between the supporting member and the electron-emitting surface in the electron emitter (see '550, Figs 2A-2B).

7. Claims 28, 29 and 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (US 5,982,095) in view of Kumar (US 5,861,707).

Regarding claim 28, Jin discloses a cold cathode discharge device comprising:

an envelope (see Figs. 2, 6 and 7) filled with a discharge gas therein;

a cold cathode comprising a supporting member **13** and an electron emitter **20** with an electron-emitting surface, the electron emitter being positioned in the envelope;

and the discharge gas comprising a gas including an element with a principal radiation peak of 200 nm or less in wavelength (see Col. 3, lines 33-34 and 39). Jin discloses the electron emitter comprising diamond, but is silent regarding the limitation of said emitter comprising a mixed phase of diamond phase and conductive carbon phase.

However, in the same field of endeavor, Kumar discloses a cold cathode comprising an electron emitter having a mixed phase of diamond phase **14** and conductive carbon phase **42**, the diamond phase comprises granular bodies and the conductive carbon phase being formed between the granular bodies, and teaches said electron emitter to provide a thermally stable emission area, a longer lifetime of the device in operation, and to require only a relatively small voltage for emission to occur (see Col. 3, lines 55-56, 62-63, and Col. 6, line 3). Thus, it would

have been obvious to one of ordinary skill in the art at the time the invention was made to use the electron emitter disclosed by Kumar in the cold cathode discharge device of Jin, in order to provide a thermally stable emission area, a longer lifetime of the device in operation, and to require only a relatively small voltage for emission to occur.

Regarding claim 29, Jin-Kumar discloses the discharge gas being xenon (see Col. 3, lines 33-34 of '095).

Regarding claim 31, Jin-Kumar discloses the conductive carbon phase comprising graphite (see Col. 6, lines 1-4 of `707).

Regarding claim 32, Jin-Kumar discloses the electron-emitting surface being rough and the conductive carbon being exposed on the surface (see Figs. 3E and 5E of `707).

Regarding claim 33, Jin-Kumar discloses the envelope being an elongated envelope having the supporting member in both end regions thereof (see `095, Figs. 6-7).

8. Claims 28-30 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jin et al. (US 5,982,095) in view of Patterson et al. (US 6,441,550).

Referring to claim 28, Jin discloses a cold cathode discharge device comprising:

an envelope (see Figs. 2, 6 and 7) filled with a discharge gas therein;

a cold cathode comprising a supporting member **13** and an electron emitter **20** with an electron-emitting surface, the electron emitter being positioned in the envelope;

and the discharge gas comprising a gas including an element with a principal radiation peak of 200 nm or less in wavelength (see Col. 3, lines 33-34 and 39). Jin discloses the electron

emitter comprising diamond, but is silent regarding the limitation of said emitter comprising a mixed phase of diamond phase and conductive carbon phase.

However, in the same field of endeavor, Patterson discloses a cold cathode comprising an electron emitter having a mixed phase of diamond phase **201** and conductive carbon phase **203**, the diamond phase comprises granular bodies and the conductive carbon phase being formed between the granular bodies, wherein the conductive carbon extends in the form of a channel, and teaches said electron emitter to provide a device having a longer lifetime and capable of operating at higher current densities and greater stability over longer time periods than emitter materials of the prior art (see Col. 6, lines 14-24). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the electron emitter disclosed by Patterson in the cold cathode discharge device of Jin, with the purpose of providing a device having a longer lifetime capable of operating at higher current densities and greater stability over longer time periods than emitter materials of the prior art.

Referring to claim 29, Jin-Patterson discloses the discharge gas being xenon (see Col. 3, lines 33-34 of '095).

Referring to claim 30, Jin-Patterson discloses the diamond of the electron emitter including a donor impurity (see Col. 4, lines 27-31 of `550).

Referring to claim 33, Jin-Patterson discloses the envelope being an elongated envelope having the supporting member in both end regions thereof (see `095, Figs. 6-7).

Referring to claim 34, Jin-Patterson discloses the conductive carbon phase extending in the form of a channel between the supporting member and the electron-emitting surface in the electron emitter (see `550, Figs 2A-2B).

Double Patenting

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 21-34 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 6,781,294. Although the conflicting claims are not identical, they are not patentably distinct from each other for the following reasons:

Application SN 10/810,637	US Patent No. 6,781,294	Reasons for rejecting under obviousness-type double patenting:
Claim 21	Claim 4	US `294 claims a cold cathode discharge device comprising: an envelope filled with a discharge gas therein; cold cathode comprising a supporting member of conductive material and an electron emitter with an electron-emitting surface to emit electrons supported by the supporting member, the electron emitter being positioned in the envelope; and the discharge gas comprises a rare gas and mercury, wherein the electron emitter comprises a mixed phase of diamond phase and conductive carbon phase, the diamond phase comprising granular bodies, and the conductive phase being formed between the granular bodies.
Claim 22	Claim 4 in view of Claim 2	Claim 4 of US `294 claims the discharge gas being a rare gas; while, claim 2 exemplifies the gas being xenon.
Claim 23	Claim 3	US `294 claims the diamond phase of the electron emitter comprising a donor impurity.
Claim 24	Claim 4	US `294 claims the conductive carbon comprising graphite or

		amorphous carbon layers.
Claim 25	Claim 5	US '294 claims the electron-emitter surface being rough, and the conductive carbon phase being exposed on the electron emitting surface.
Claim 26	Claim 6	US '294 claims the envelope being an elongated envelope having the supporting member in both regions thereof.
Claim 27	Claim 4	US '294 claims the conductive carbon phase extending in the form of a channel between the supporting member and the electron-emitting surface in the electron emitter
Claim 28	Claim 10	US '294 claims a cold cathode discharge device comprising: an envelope filled with a discharge gas therein; a cold cathode comprising a supporting member and an electron emitter with an electron-emitting surface, the electron emitter being positioned in the envelope; the discharge gas comprising a gas including an element with a principal radiation peak of 200 nm or less in wavelength, wherein the electron emitter comprises a mixed phase of diamond phase and conductive carbon phase, the diamond phase comprising granular bodies, and the conductive phase being formed between the granular bodies.
Claim 29	Claim 10 in view of Claim 8	Claim 10 of US '294 claims the discharge gas being a rare gas; while, claim 8 exemplifies the gas being xenon.
Claim 30	Claim 9	US '294 claims the diamond phase of the electron emitter comprising a donor impurity.
Claim 31	Claim 10	US '294 claims the conductive carbon comprising graphite or amorphous carbon layers.
Claim 32	Claim 11	US '294 claims the electron-emitter surface being rough, and the conductive carbon phase being exposed on the electron emitting surface.
Claim 33	Claim 12	US '294 claims the envelope being an elongated envelope having the supporting member in both regions thereof.
Claim 34	Claim 10	US '294 claims the conductive carbon phase extending in the form of a channel between the supporting member and the electron-emitting surface in the electron emitter

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to German Colón whose telephone number is 571-272-2451. The examiner can normally be reached on Monday thru Thursday, from 8:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gc

Kevin Guharay